

**BREEDING BIRD STUDY FOR PROPOSED GRANITE RELIABLE POWER  
WINDPARK, COOS COUNTY, NEW HAMPSHIRE**

**DIXVILLE PEAK SUPPLEMENT  
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## Table of Contents

List of Tables .....	iii
List of Figures .....	iv
Introduction .....	1
Study Area .....	1
Methods .....	2
Results .....	5
Discussion .....	10
References Cited:.....	11
Appendix A. Distribution and abundance tables for detections of species of conservation concern in the vicinity of proposed turbine strings in the Granite Reliable Power Wind Park and Dixville Peak, Coos County, New Hampshire.....	12
Appendix B. Summary of Site Characteristics, Habitat Conditions, and Breeding Bird Communities for a Conceptual Turbine String on Dixville Peak, Coos County, New Hampshire.....	21

## List of Tables

Table 1. Species detected during point count surveys on Dixville Peak during June 2005 and June 2007.....	5
Table 2. Relative abundance, frequency of detection, frequency of occurrence, and conservation status of bird species detected during point count surveys on Dixville Peak, Coos County, New Hampshire during June 2005 and June 2007 .....	8
Table 3. Bird relative abundance metrics by nest, forest type, and successional stage guilds for proposed turbine strings in the Granite Reliable Power Windpark, Coos County, New Hampshire, June-July 2007 and June 2005 (Dixville Peak only). ....	9
<b>Table 4.</b> Bird species richness metrics by nest, forest type, and successional stage guilds for proposed turbine strings in the Granite Reliable Power Windpark, Coos County, New Hampshire, June-July 2007 and June 2005 (Dixville Peak only) .....	9
Table A. 1. Distribution and abundance of Bicknell’s Thrush detections in the vicinity of proposed turbine strings in the Granite Reliable Power Wind Park and Dixville Peak, Coos County, New Hampshire.....	13
Table A. 2. Distribution and abundance of Yellow-bellied Flycatcher detections in the vicinity of proposed turbine strings in the Granite Reliable Power Wind Park and Dixville Peak, Coos County, New Hampshire.....	13
Table A. 3. Distribution and abundance of Gray Jay detections in the vicinity of proposed turbine strings in the Granite Reliable Power Wind Park and Dixville Peak, Coos County, New Hampshire.....	14
Table A. 4. Distribution and abundance of Black-throated Blue Warbler detections in the vicinity of proposed turbine strings in the Granite Reliable Power Wind Park and Dixville Peak, Coos County, New Hampshire.....	14
Table A. 5. Distribution and abundance of Blackpoll Warbler detections in the vicinity of proposed turbine strings in the Granite Reliable Power Wind Park and Dixville Peak, Coos County, New Hampshire.....	15
Table B. 1. Point count survey results for Dixville Peak transect.....	22
Table B. 2. Bird species composition metrics for Dixville Peak transect.....	23
Table B. 3. Species of conservation concern documented in the vicinity of the proposed Dixville turbine string.....	23
Table B. 4. Properties of soils underlying proposed Dixville turbine string.....	24

## **List of Figures**

Figure 1. Dixville Peak portion of proposed Granite Reliable Power Windpark Project Area, Coos County, New Hampshire.....	2
Figure 2. Locations of bird survey points on the Dixville Peak in the proposed Granite Reliable Power Windpark Project Area, Coos County, New Hampshire.....	3
Figure 3. Locations of species at high risk level on Dixville Peak transect in the proposed Granite Reliable Power Windpark Project Area, Coos County, New Hampshire.....	6
Figure 4. Locations of species at moderate risk level on the Dixville Peak transect in the proposed Granite Reliable Power Windpark Project Area, Coos County, New Hampshire.....	7
Figure A1. Locations of Bicknell's Thrush detections on the Dixville Peak transect in the proposed Granite Reliable Power Windpark Project Area, Coos County, New Hampshire.....	16
Figure A2. Locations of Yellow-bellied Flycatcher detections on the Dixville Peak transect in the proposed Granite Reliable Power Windpark Project Area, Coos County, New Hampshire.....	17
Figure A3. Locations of Gray Jay detections on the Dixville Peak transect in the proposed Granite Reliable Power Windpark Project Area, Coos County, New Hampshire.....	18
Figure A4. Locations of Black-throated Blue Warbler detections on the Dixville Peak transect in the proposed Granite Reliable Power Windpark Project Area, Coos County, New Hampshire.....	19
Figure A5. Locations of Blackpoll Warbler detections on the Dixville Peak transect in the proposed Granite Reliable Power Windpark Project Area, Coos County, New Hampshire.....	20
Figure B1. Locations of 2005 and 2007 bird survey points along the Dixville Peak transect in the proposed Granite Reliable Power Windpark Project Area, Coos County, New Hampshire.....	25

# **BREEDING BIRD STUDY FOR PROPOSED GRANITE RELIABLE POWER WINDPARK, COOS COUNTY, NEW HAMPSHIRE**

## **DIXVILLE PEAK SUPPLEMENT**

### **Introduction**

This report provides information about breeding birds on Dixville Peak, Dixville, New Hampshire as an addendum to the report of 31 October 2007, "Breeding Bird Study for Proposed Granite Reliable Power Windpark, Coos County, New Hampshire" (hereafter referred to as the windpark study). Granite Reliable Power LLC signed a cooperative agreement with Wagner Forest Management in fall 2007 for inclusion of Wagner lands in the Granite Reliable Power Windpark. As a result, the design of the proposed windpark has been modified to include eight turbines on Dixville Peak on Wagner Forest Management lands.

Wagner Forest Management had previously contracted with Carol Foss and Laura Deming as independent consulting biologists to conduct Bicknell's Thrush surveys on Wagner lands during the 2005-2007 breeding seasons. The objectives of these surveys were:

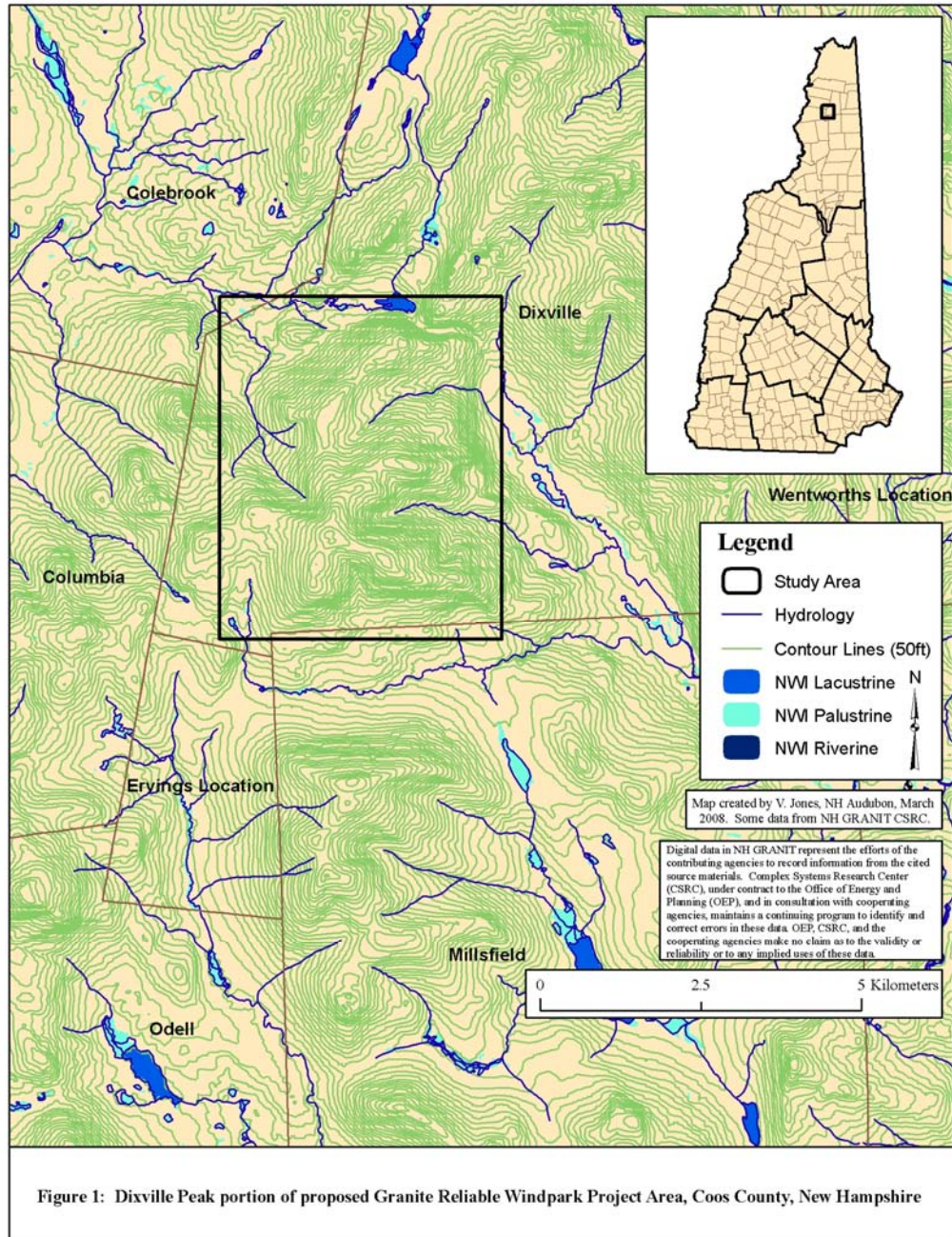
- To provide a preliminary assessment of Bicknell's Thrush distribution on Wagner lands
- To provide a preliminary assessment of habitat conditions in areas supporting Bicknell's Thrush on Wagner lands.

These surveys included Dixville Peak in 2005 and 2007 and followed the same field protocol employed in the windpark study. This report provides data from these surveys analyzed in the format of the windpark study to supplement the original report.

### **Study Area**

The project area is located in the town of Dixville, Coos County, New Hampshire (Figure 1). This area lies within the White Mountain Subregion of the Adirondack-New England Province of the US Forest Service ecological classification system (Bailey et. al. 1994). The subregion is characterized by mountainous terrain with elevations ranging from 300 to 1,200 m (1,000 to 4,000 ft), some isolated peaks higher than 1,500 m (5,000 ft), and surrounding gently sloping hills under 900 m (3,000ft). Thin, stony soils support northern hardwood and mixed forests, with lowland spruce-fir at lower elevations and montane spruce-fir at higher elevations. Lands in the vicinity of the project area have a 100+-year history of industrial forestry with an extensive road network used for logging operations. Agriculture has been the dominant land use along the valleys to the east and west of the mountains. Recreation in this region includes motorized activities such as snowmobiling, and non-motorized activities such as fishing, hunting, and hiking.

The proposed Dixville Peak turbine string is located along the ridgeline of Dixville Mountain between Dixville Peak and a lower peak to the southeast. Dixville Peak is 1043 m (3422 ft) in elevation, and the ridge extending approximately 1000 m (3300 ft) to the southeast ends at a 1048 m (3439 ft) peak. Red-spruce/balsam fir forest dominates the higher elevations of Dixville Mountain.



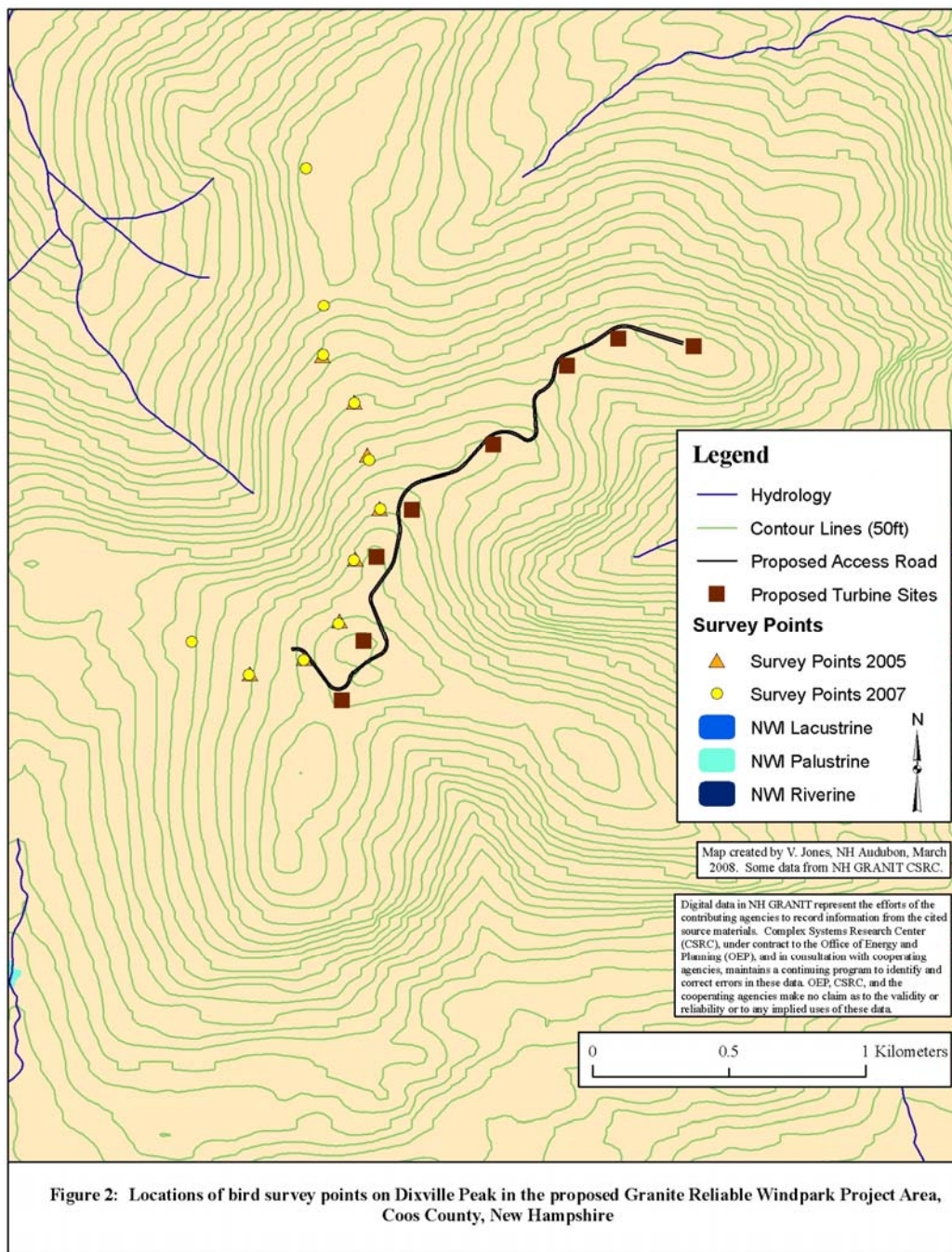
## Methods

### *Location of Survey Points*

Bird surveys were conducted in habitat dominated by red spruce and balsam fir, typically above 760 m (2500 ft) in elevation, along trails and access roads leading over peaks and ridgelines of Dixville Mountain. Points were located approximately 250 m (820 ft) apart to avoid double-counting individuals. In 2005, field staff recorded positions for eight points using a handheld



Garmin GPS unit. In 2007, these points were resurveyed, along with three additional points, for a total of eleven survey points (Figure 2.).



### *Bird Surveys*

Surveys consisted of 10-minute point counts followed by broadcasts of Bicknell's Thrush vocalizations. Surveys were conducted on 25 June 2005 and 23 June 2007 between 0500 and 0900 hours under conditions of no precipitation. Ideally, bird surveys are conducted on days with

little or no wind, i.e., conditions up to level 4 on the Beaufort Wind Scale (moderate breeze), which raises dust and moves small branches. Stronger winds can impair an observer's ability to hear birds and may affect activity levels of some species.

Data collected at each point included date and start time, transect name, observer, point coordinates (from a handheld GPS unit), weather conditions and description of general habitat conditions at the point location, including forest type and age structure, evidence of natural or human disturbance, overstory height, density, typical diameters, and species composition; understory height, density, and species composition; ground cover components and density; special habitat features such as standing dead trees and root wads; and mammal sign.

During the 10-minute listening period, observers recorded the species, number of individuals, distance category (within 50 m, beyond 50 m, or flyover), and observed behavior for each bird detected by sight or sound. At points where no Bicknell's Thrush were detected during the 10-minute listening period, vocalizations of Bicknell's Thrush songs and calls were broadcast using a portable sound system. Observers used a portable tape deck in 2005, and a portable Western Rivers MP3 unit in 2007. The broadcast protocol used during this project was developed by the Conservation Biology Department of the Vermont Institute of Natural Science (VINS) for Bicknell's Thrush surveys in New York, Vermont, New Hampshire, and Maine.

### *Analysis*

We described the breeding bird species composition for the Project Site in terms of relative abundance (number of individuals detected per number of points surveyed), and frequency of occurrence (number of points with detections per number of points surveyed), calculating each metric separately for each year. Individuals detected at a point before or after the 10-minute count or between points, and any Bicknell's Thrush that responded to the broadcast but were not detected during the 10-minute count were included in the species list for the survey, but not included in the numerical analysis.

We then used a series of metrics to characterize the breeding bird community along the transect. These metrics included species richness (all species detected during point counts and between counts) and relative abundance (all individuals detected during the 10-minute point counts, regardless of estimated distance from point) for four nest guilds: ground, shrub-sapling, bole, and canopy; two forest type specialist groups: softwood and hardwood; and two successional stage specialist groups: early and late.

To facilitate comparison of community composition across turbine strings in the windpark study, we classified species richness and relative abundance values into categories of low, average, and high. For species richness, we determined the range of values for each metric and considered the bottom quarter of values in the low category, the top quarter in the high category, and the middle half in the medium category. For relative abundance, we calculated the mean and standard deviation of values for each metric and considered metric values within one standard deviation of the mean to be in the medium category, those below one standard deviation from the mean to be in the low category, and those above to be in the high category. We compared the Dixville Peak values with the categories established during the windpark study.



## Results

Point count surveys yielded 80 individuals of 12 species in 2005 and 50 individuals of 12 species in 2007, for an overall total of 16 species detected during the point counts (Table 1). Two additional species (Tree Swallow and American Crow) were observed between points or as flyovers.

**Table 1. Species detected during point count surveys on Dixville Peak during June 2005 and June 2007.**

Species	Conservation status		Number of individuals detected	
	State <sup>1</sup>	BCR 14 <sup>2</sup>	2005	2007
Bicknell's Thrush *	Special concern	Highest	3	0
Blackpoll Warbler		Moderate	11	1
Black-throated Blue Warbler		High	0	3
Blue-headed Vireo			0	1
Golden-crowned Kinglet			4	0
Gray Jay		Moderate	1	0
Magnolia Warbler			4	0
Nashville Warbler			2	7
Pine Siskin			0	3
Ruby-crowned Kinglet			0	1
Slate-colored Junco			7	7
Swainson's Thrush			11	5
White-throated Sparrow			18	16
Winter Wren			7	1
Yellow-bellied Flycatcher		High	5	1
Yellow-rumped Warbler			7	4
<b>Total</b>			<b>80</b>	<b>50</b>

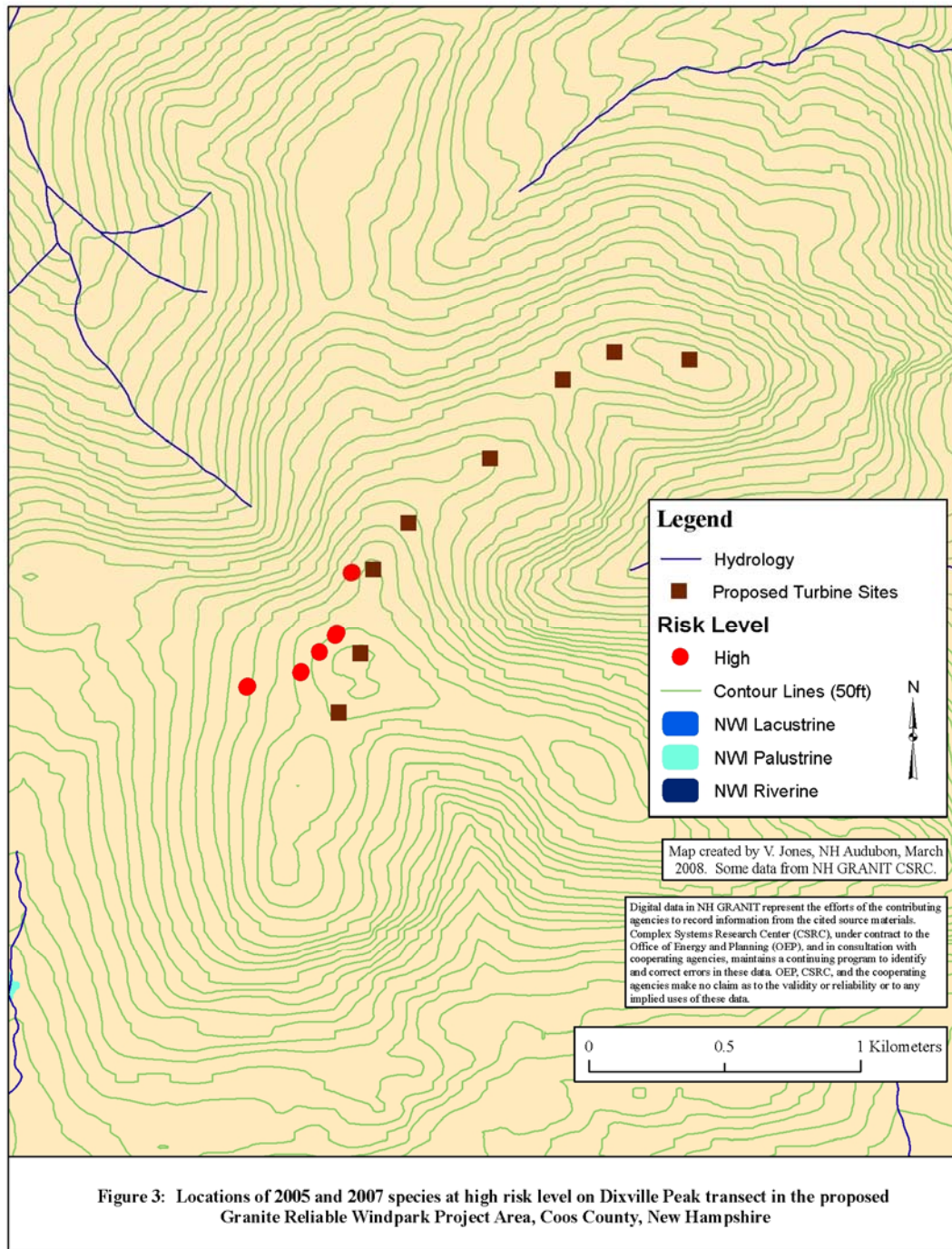
\* In 2007, all Bicknell's Thrush were detected during broadcast sessions, after the 10-minute point count.

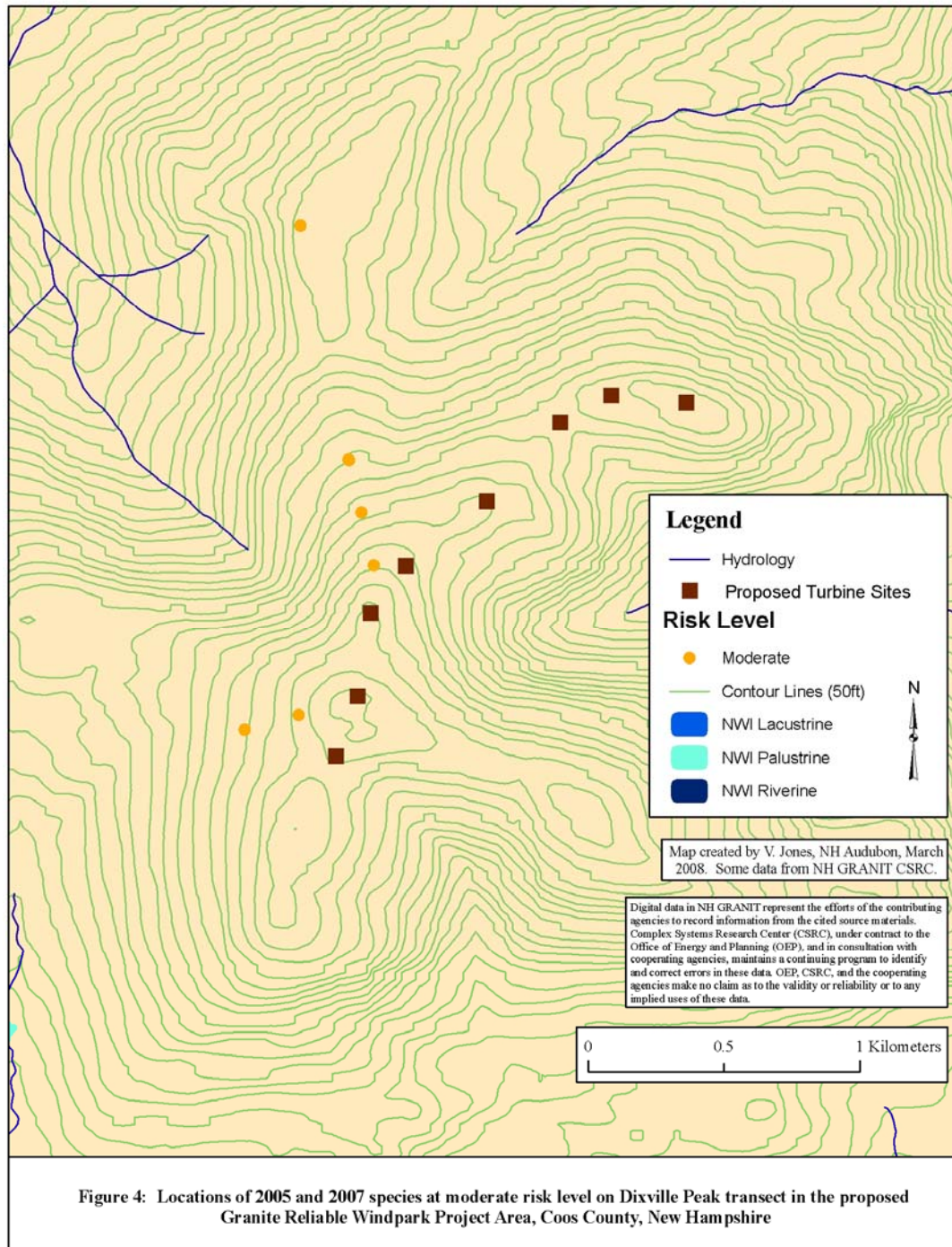
1. from New Hampshire's list of Threatened, Endangered, and Special Concern species

2. from the North American Landbird Conservation Plan list of Priority Species for BCR 14 (NABCI 2000).

Field surveys documented a total of five species of conservation concern along the transect, with four detected in each year. These species included one of highest concern (detected during point counts in 2005 and during broadcast sessions in 2007), two of high concern, and two of moderate concern. Species of concern detected in both years included Bicknell's Thrush, Blackpoll Warbler, and Yellow-bellied Flycatcher. Gray Jay was detected in 2005 and Black-throated Blue Warbler was detected in 2007.

Species of conservation concern were classified into levels of risk for the Project Area specifically, based on state and regional status, as well as the risk to the species' population with respect to the proposed wind development. For the project area, Bicknell's Thrush were classified as being at High Risk, Yellow-bellied Flycatcher and Gray Jay were classified as being at Moderate Risk, and Blackpoll and Black-throated Blue Warblers were classified as being at Low Risk. Locations of these species along the transect are shown in Figures 3 and 4.





The White-throated Sparrow was by far the most abundant species detected, followed by Swainson's Thrush and Blackpoll Warbler (Table 2). Yellow-bellied Flycatcher, Winter Wren, Nashville and Yellow-rumped warblers, and Slate-colored Junco also were detected at more than half of the points surveyed in at least one of the two survey years.

**Table 2. Relative abundance, frequency of detection, frequency of occurrence, and conservation status of bird species detected during point count surveys on Dixville Peak, Coos County, New Hampshire during June 2005 and June 2007.** Species listed in decreasing order by relative abundance in year of higher abundance. (Corresponds to Table 4 in windpark report.)

Species	Relative Abundance (n=8 pts) 2005, 2007	Frequency of Occurrence (n=8 pts) 2005, 2007	Frequency of Detection (n=80 indivs) 2005, 2007	Conservation Status	
				State	BCR 14
<b>White-throated Sparrow</b>	2.25, 1.45	0.88, 0.82	0.23, 0.42		
<b>Swainson's Thrush</b>	1.38, 0.45	1.00, 0.45	0.14, 0.10		
<b>Blackpoll Warbler</b>	1.38, 0.09	0.88, 0.09	0.14, 0.02		Moderate
<b>Slate-colored Junco</b>	0.88, 0.64	0.63, 0.45	0.09, 0.14		
<b>Yellow-rumped Warbler</b>	0.88, 0.36	0.50, 0.36	0.09, 0.08		
<b>Winter Wren</b>	0.88, 0.09	0.88, 0.09	0.09, 0.02		
<b>Nashville Warbler</b>	0.25, 0.64	0.25, 0.55	0.03, 0.14		
<b>Yellow-bellied Flycatcher</b>	0.63, 0.09	0.63, 0.09	0.06, 0.02		High
<b>Magnolia Warbler</b>	0.50, 0	0.38, 0	0.05, 0		
<b>Golden-crowned Kinglet</b>	0.50, 0	0.25, 0	0.05, 0		
<b>Bicknell's Thrush</b>	0.38, 0	0.38, 0	0.04, 0	Special Concern	Highest
<b>Black-throated Blue Warbler</b>	0, 0.27	0, 0.27	0, 0.06		High
<b>Pine Siskin</b>	0, 0.27	0, 0.18	0, 0.06		
<b>Gray Jay</b>	0.13, 0	0.13, 0	0.01, 0		
<b>Blue-headed Vireo</b>	0, 0.09	0, 0.09	0, 0.02		Moderate
<b>Ruby-crowned Kinglet</b>	0, 0.09	0, 0.09	0, 0.02		

Ground-nesting birds and softwood specialists dominated the breeding bird population on Dixville Peak in both survey years; numbers of early and late successional stage specialists were roughly equal (Table 3). Species composition in both survey years was dominated by ground- and shrub-sapling-nesting species and softwood specialists (Table 4).



**Table 3. Bird relative abundance metrics by nest, forest type, and successional stage guilds for proposed turbine strings in the Granite Reliable Power Windpark, Coos County, New Hampshire, June-July 2007 and June 2005 (Dixville Peak only).** High values in **bold**, low values in *italics*. (Corresponds to Table 6 in windpark report.)

Turbine string	Nest guild				Forest type specialists		Successional stage specialists	
	Ground	Shrub-sapling	Bole	Canopy	Softwood	Hardwood	Early	Late
Columbia	5.34	3.83	<b>2.50</b>	2.92	8.33	0.67	2.67	6.67
Dummer Ridge	4.53	7.01	1.57	3.67	2.39	<b>7.44</b>	4.98	6.76
Hedgehog Brook	5.65	6.65	1.00	2.50	5.45	4.15	4.85	<i>4.45</i>
Kelsey Notch	4.00	4.33	1.32	<b>5.32</b>	5.32	3.33	3.00	<b>7.66</b>
Long Mountain	6.40	6.00	1.20	3.40	6.40	3.00	5.80	6.00
Millsfield Mountain	6.06	5.91	0.69	2.34	5.39	2.65	6.90	<i>4.35</i>
Mt. Kelsey	<i>2.70</i>	<i>1.56</i>	0.96	2.93	6.75	<i>0</i>	<i>0.71</i>	4.99
Owlhead Mountain	<i>1.98</i>	<i>2.43</i>	1.22	<i>1.99</i>	4.5	<i>0.44</i>	<i>0.66</i>	<i>4.33</i>
Rocky Brook	5.32	6.00	<i>0.66</i>	4.20	5.66	2.99	5.33	5.98
Trio Ponds East	<b>10.33</b>	6.67	1.00	<i>2.16</i>	7.49	2.16	<b>8.16</b>	5.49
Trio Ponds South	7.84	<b>7.34</b>	1.00	2.34	6.35	3.50	<b>9.00</b>	4.68
Whitcomb Mountain	2.25	2.75	1.50	3.25	8.5	<i>0</i>	<i>0.50</i>	6.00
Whitcomb Spur	<b>11.33</b>	6.33	<b>2.00</b>	<b>5.00</b>	<b>13.33</b>	2.00	<b>9.34</b>	<b>9.00</b>
Dixville 2005	4.88	3.62	<i>0</i>	<i>1.38</i>	6.75	<i>0</i>	2.75	2.25
Dixville 2007	4.00	<i>1.25</i>	<i>0</i>	<i>1.00</i>	3.75	<i>0.38</i>	2.00	<i>2.12</i>

**Table 4. Bird species richness metrics by nest, forest type, and successional stage guilds for proposed turbine strings in the Granite Reliable Power Windpark, Coos County, New Hampshire, June-July 2007 and June 2005 (Dixville Peak only).** High values in **bold**, low values in *italics*. (Corrects and replaces Table 7 in windpark report.)

Turbine String	Total number of species	Nest guild				Forest type specialists		Successional stage specialists	
		Ground	Shrub-sapling	Bole	Canopy	Softwood	Hardwood	Early	Late
Columbia Mountain	22	5	6	<b>8</b>	3	11	2	2	12
Dummer Ridge	39	<b>9</b>	<b>14</b>	4-5	<b>10</b>	9	<b>13</b>	<b>12</b>	14
Hedgehog Brook	26	7	9	3	5	11	5	5	11
Kelsey Notch	23	6	6	4	8	11	4	4	12
Long Mountain	24	6	9	3	8	9	6	5	12
Millsfield Mountain	44	<b>9</b>	11	<b>8</b>	<b>10</b>	13	<b>10</b>	<b>9</b>	19
Mt. Kelsey	21	5	7	4-5	6	<b>15</b>	<i>0</i>	2	11
Owlhead Mountain	24	6	6	5	7	<b>15</b>	1	2	15
Rocky Brook	22	5	7	5	6	9	4	4	<i>10</i>
Trio Ponds East	31	<b>8</b>	11	3	9	13	5	7	14
Trio Ponds South	36	7	11	6	<b>10</b>	<b>17</b>	5	7	16
Whitcomb Mountain	15	5	5	3	4	12	<i>0</i>	2	<i>10</i>
Whitcomb Spur	25	6	8	3-4	6	12	2	6	11
Dixville Peak '05	11	5	5	<i>0</i>	<i>1</i>	9	<i>0</i>	2	<i>3</i>
Dixville Peak '07	14	5	5	<i>0</i>	<i>4</i>	<i>10</i>	3	<i>1</i>	<i>6</i>



## Discussion

The surveys that generated the data for Dixville Peak had more limited objectives than those for the windpark study, which were:

- To determine the species composition of breeding bird communities along proposed turbine string locations and selected transmission corridor segments;
- To determine numbers and locations of any bird species of conservation concern in the immediate vicinity of proposed turbine strings and selected transmission corridor segments;
- To provide baseline data with which post-construction data could be compared.

The Dixville Peak transect was established and surveys were completed prior to inclusion of the area in the Granite Reliable Power Windpark. While overlap does exist between the transect and the proposed turbine string, approximately half of the proposed string is along a ridge not covered by surveys.

Point counts provide a sample of the birds present in the area surveyed. Individuals are included in a sample if they are audible or visible to observers during the survey period. Factors such as time of day, weather conditions, topography, vegetation characteristics, proximity to running water, a bird's breeding status, location, and the pitch and volume of its vocalizations all affect the probability of a bird's detection. Multiple samples of a given area increase the probability of detection for individuals and species. The lack of multiple surveys in a given year likely influenced the low species diversity detected for Dixville Peak. Weather conditions were extreme in both years (70 degrees F in 2005 and 40 degrees F with strong winds in 2007), which also can be expected to have affected bird activity.

The relatively low species richness detected on Dixville Peak (16 for the two years combined) compared with transects surveyed in the windpark study may result from a combination of weather conditions during surveys, as discussed above, single surveys in a given year, and the high elevation of the transect. Other transects in the proposed windpark with elevations exceeding 3000 ft. (Mt. Kelsey, Owlhead Mountain, and Whitcomb Mountain) also had relatively low species richness (15-24). Three transects with high species richness (exceeding 30 species) had maximum elevations below or barely exceeding 2500 ft. (Dummer Ridge, Trio Ponds East, Trio Ponds South); the Millsfield Mountain transect, which had the highest species richness (44), was more than twice as long as the next longest transect, and included a diversity of habitat conditions.

Relative abundance metrics for ground nesters, softwood specialists, and early successional stage specialists at Dixville Peak were in the mid-range of values for transects in the windpark study; Dixville values for bole and canopy nesters, hardwood specialists, and late successional stage specialists were low relative to windpark values. Species richness metrics for ground and shrub-sapling nesters and hardwood specialists were in the mid-range of values for transects in the windpark study; Dixville values for bole and canopy nesters, softwood and hardwood specialists, and early and late successional stage specialists were low relative to windpark values.

The primary species of conservation concern detected on Dixville Peak was the Bicknell's Thrush. Activity of this species was consistent between the two survey years and occurred in the immediate vicinity of proposed turbines. Blackpoll Warbler activity also occurred in the area of overlap between the proposed turbine string and the transect surveyed.

Presence or absence of species of conservation concern along the unsurveyed length of the proposed turbine string is unknown. Given the habitat and elevation, strong potential exists for the presence of other high and moderate concern species, including American Three-toed Woodpecker, Black-backed Woodpecker, Gray Jay, Boreal Chickadee, and Cape May and Bay-breasted warblers. Potential additional low concern species include Brown Creeper, Northern Parula, Blackburnian Warbler, and Purple Finch. Data presented in this report should not be considered comparable to that for the rest of the proposed windpark either for assessing potential impacts on habitats and species of conservation concern or for providing a baseline for post-construction monitoring.

### **References cited:**

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**Appendix A. Distribution and abundance tables for detections of species of conservation concern in the vicinity of proposed turbine strings in the Granite Reliable Power Wind Park and Dixville Peak, Coos County, New Hampshire.**

**Table A. 1 . Distribution and abundance of Bicknell's Thrush detections in the vicinity of proposed turbine strings in the Granite Reliable Power Wind Park and Dixville Peak, Coos County, New Hampshire.**

Turbine String	Locations	Individuals
Confirmed detections		
Dixville Peak (05)	5	9
Dixville Peak (07)	4	5
Columbia Mountain	1	1
Mt. Kelsey	7	8
Whitcomb Mountain	2	2
Total	19	25

**Table A. 2. Distribution and abundance of Yellow-bellied Flycatcher detections in the vicinity of proposed turbine strings in the Granite Reliable Power Wind Park and Dixville Peak, Coos County, New Hampshire.**

Turbine String	Locations	Individuals
Confirmed detections		
Dixville Peak (05)	5	5
Dixville Peak (07)	2	2
Hedgehog Brook	2	2
Kelsey Notch	2	2
Long Mountain	2	2
Mt. Kelsey	9	11
Owlhead Mountain	5	7
Rocky Brook	1	1
Trio Ponds East	4	4
Trio Ponds South	3	3
Whitcomb Mountain	3	3
Whitcomb Spur	2	3
Total	40	45

**Table A. 3. Distribution and abundance of Gray Jay detections in the vicinity of proposed turbine strings in the Granite Reliable Power Wind Park and Dixville Peak, Coos County, New Hampshire.**

Turbine String	Locations	Individuals
Confirmed detections		
Dixville Peak (05)	1	1
Dixville Peak (07)	0	0
Mt. Kelsey	1	1
Owlhead Mountain	1	2
Trio Ponds South	1	1
Whitcomb Spur	1	2
Total	4	6

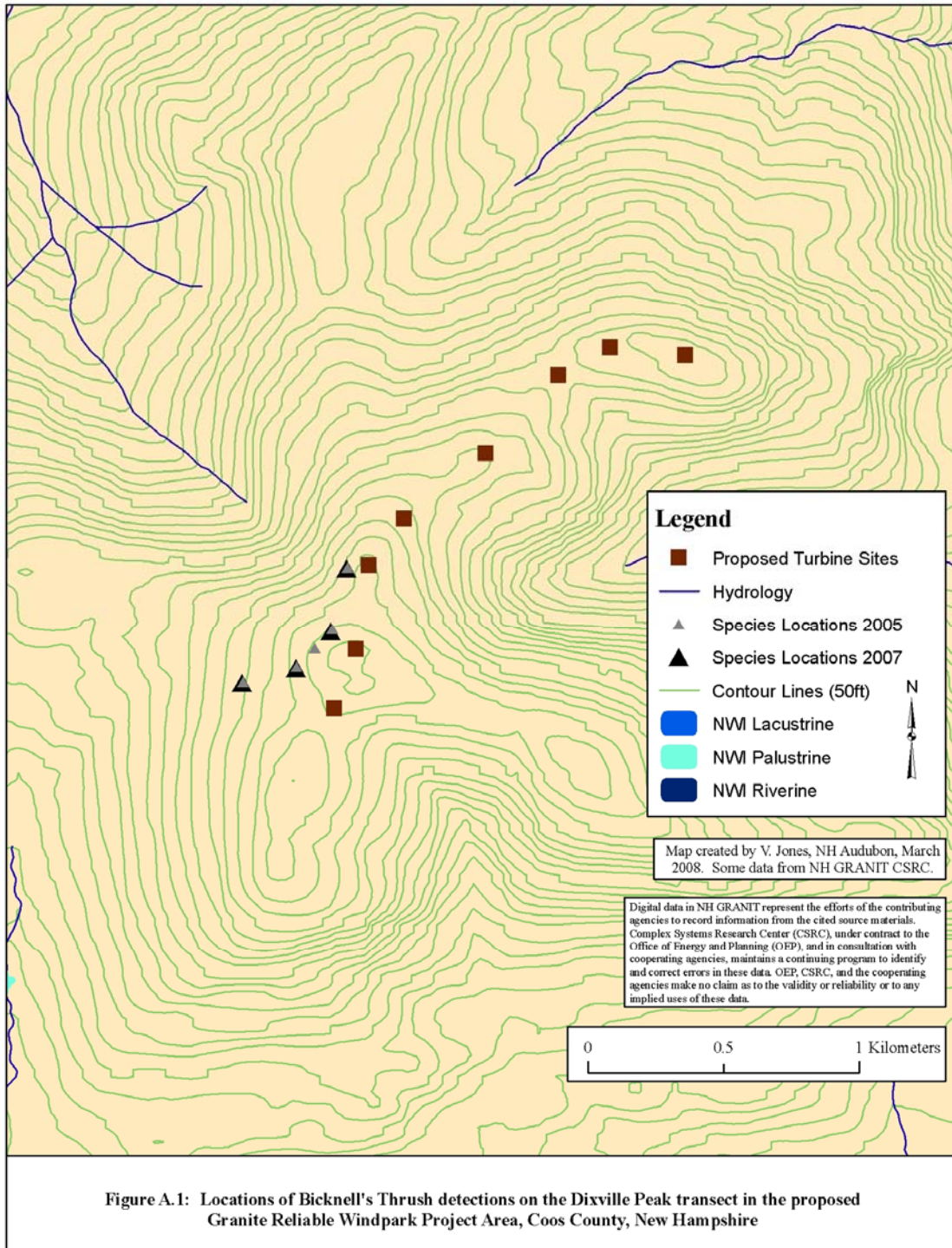
**Table A. 4. Distribution and abundance of Black-throated Blue Warbler detections in the vicinity of proposed turbine strings in the Granite Reliable Power Wind Park and Dixville Peak, Coos County, New Hampshire.**

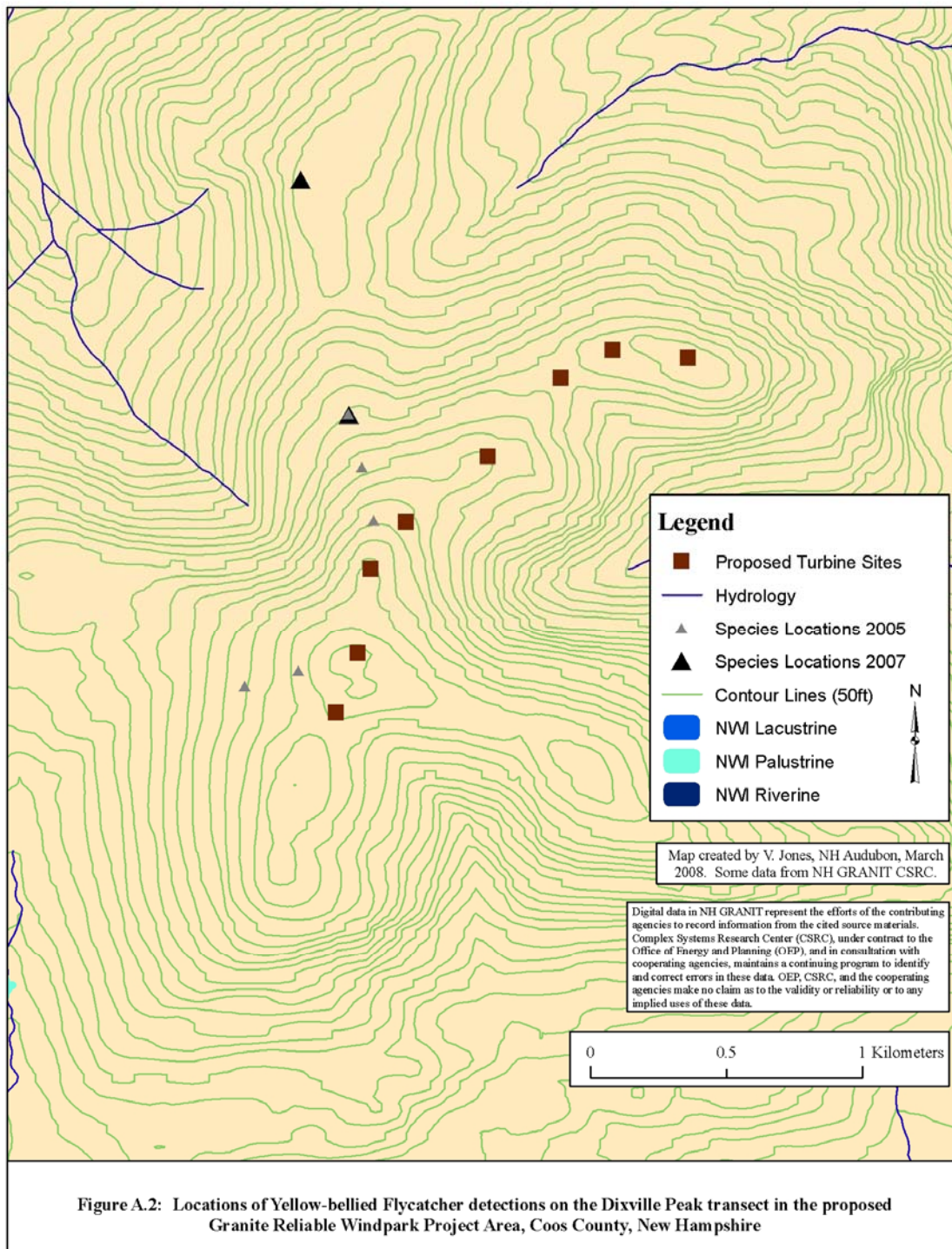
Turbine String	Locations	Individuals
Confirmed detections		
Dixville Peak (05)	0	0
Dixville Peak (07)	3	3
Columbia Mountain	3	4
Dummer Ridge	16	21
Hedgehog Brook	6	12
Long Mountain	5	7
Millsfield Mountain	20	24
Owlhead Mountain	6	9
Rocky Brook	4	6
Trio Ponds East	8	12
Trio Ponds South	4	5
Whitcomb Spur	1	1
Total	76	104



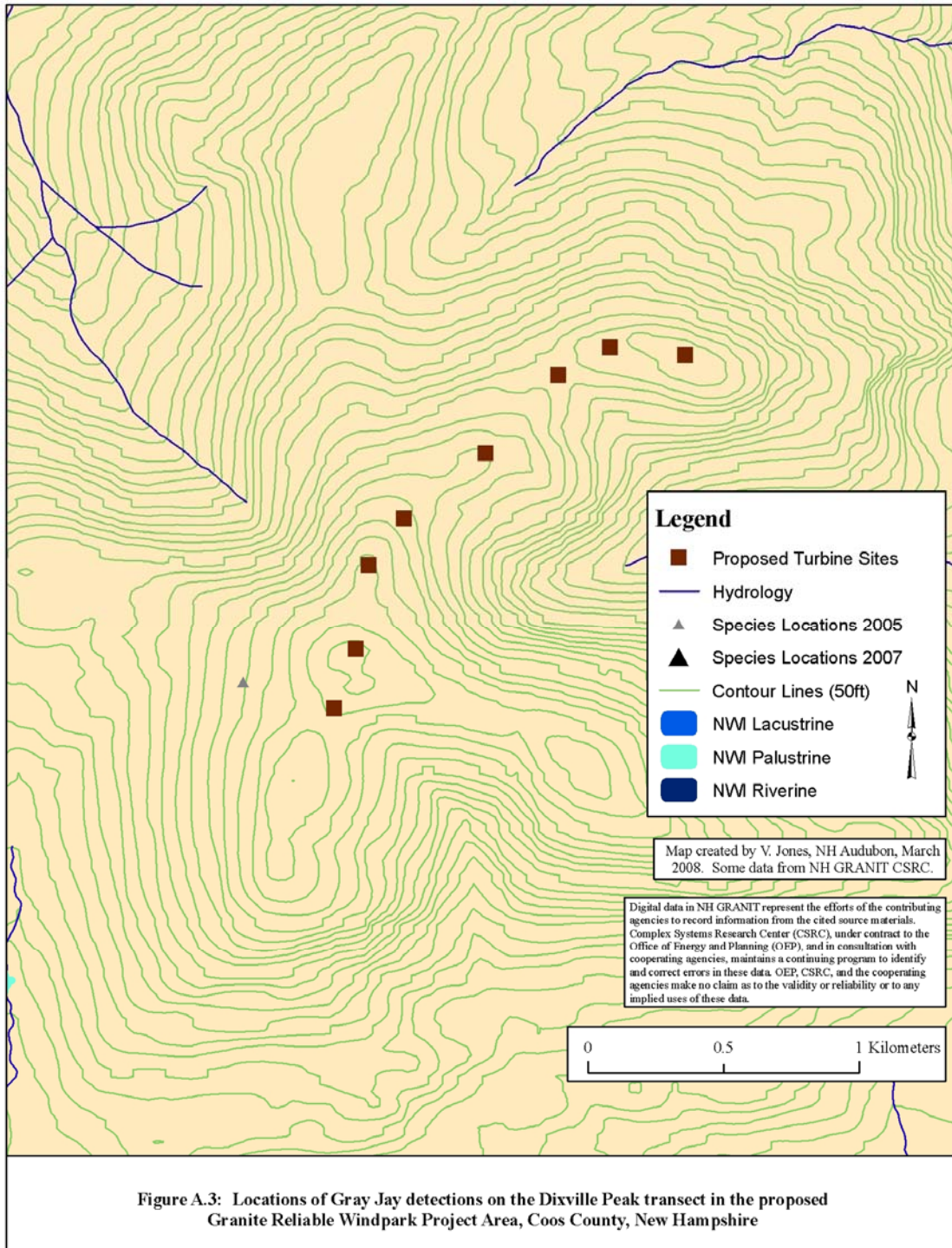
**Table A. 5. Distribution and abundance of Blackpoll Warbler detections in the vicinity of proposed turbine strings in the Granite Reliable Power Wind Park and Dixville Peak, Coos County, New Hampshire.**

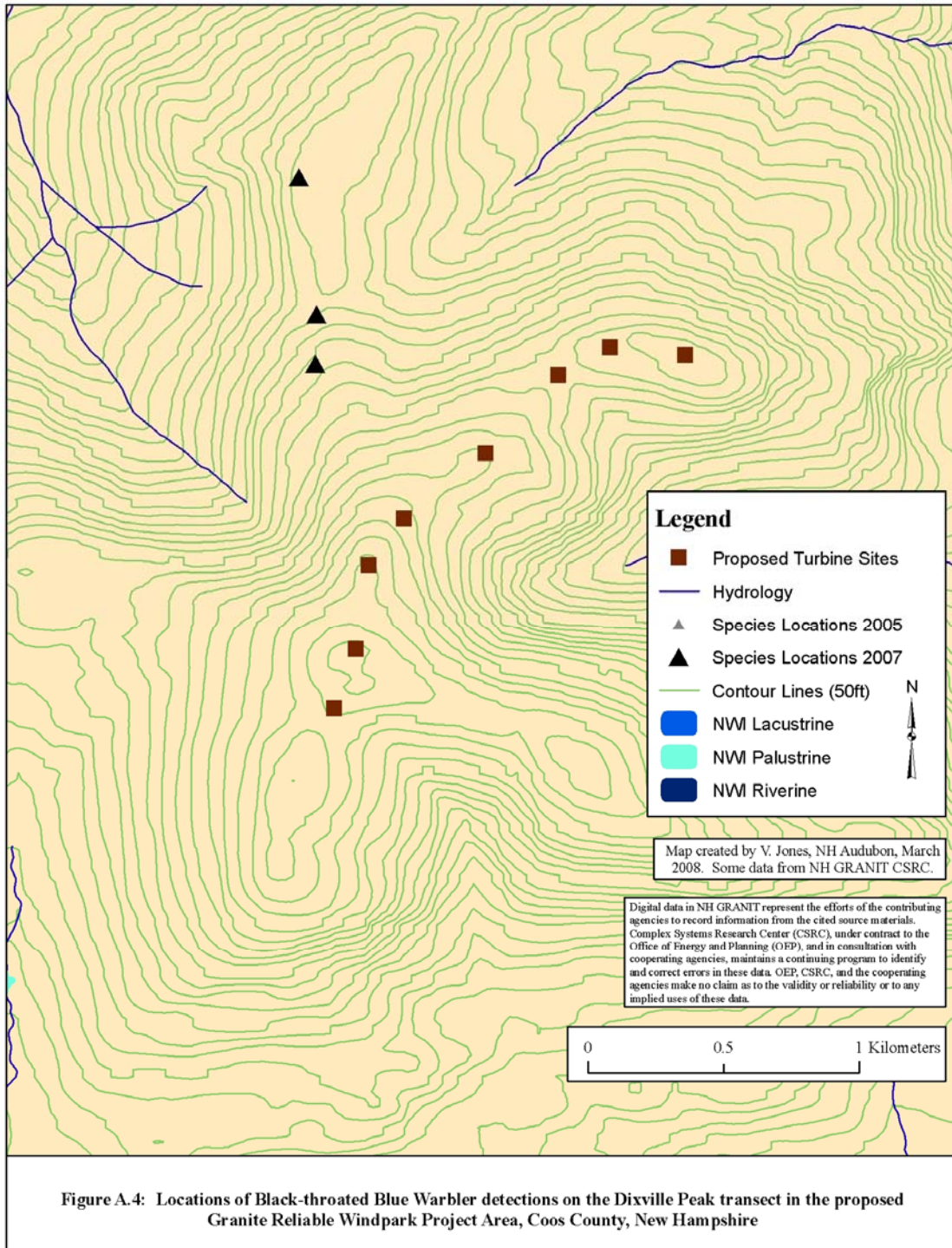
Turbine String	Locations	Individuals
Confirmed detections		
Dixville Peak (05)	7	11
Dixville Peak (07)	7	7
Columbia Mountain	4	4
Hedgehog Brook	3	3
Kelsey Notch	1	2
Long Mountain	4	6
Millsfield Mountain	16	18
Mt. Kelsey	13	16
Owlhead Mountain	5	16
Rocky Brook	3	4
Trio Ponds East	3	3
Trio Ponds South	6	7
Whitcomb Mountain	4	6
Whitcomb Spur	3	5
Total	79	108



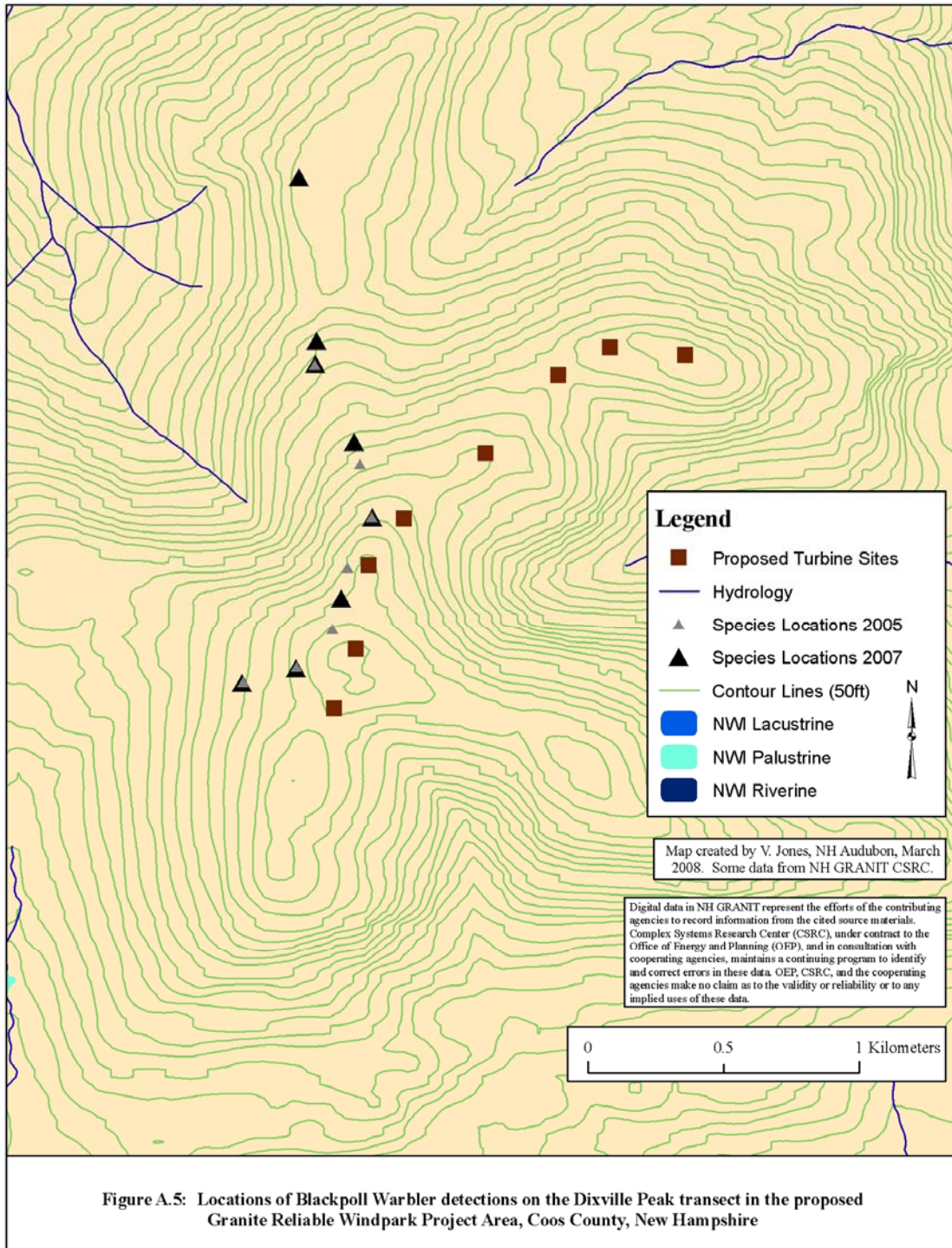












**Appendix B. Summary of Site Characteristics, Habitat Conditions,  
and Breeding Bird Communities for a Conceptual Turbine String  
on Dixville Peak, Coos County, New Hampshire**

**Turbine String: Dixville**

**Approximate Length:** 2036 m (6680 ft; 1.27 mi)

**Approximate Elevation Range:** 905-1059 m (2969-3475 ft.)

**Bird community composition:** Point count surveys documented 51 individuals of 13 bird species along the Dixville transect (Table B.1). Table B.2. summarizes species composition by nesting guild, forest type, and successional stage. In addition to birds detected during point counts, Bicknell's Thrush responded to broadcast surveys at 4 points.

**Table B. 1. Point count survey results for Dixville Peak transect**

Species	Relative abundance		Frequency of occurrence	
	2005	2007	2005	2007
White-throated Sparrow	2.25	1.45	0.88	0.82
Nashville Warbler	0.25	0.64	0.25	0.54
Slate-colored Junco	0.88	0.64	0.62	0.45
Swainson's Thrush	1.38	0.45	1.00	0.45
Bicknell's Thrush	0.38	0.45	0.38	0.36
Yellow-rumped Warbler	0.00	0.36	0.00	0.36
Black-throated Blue Warbler	0.00	0.27	0.00	0.27
Pine Siskin	0.00	0.27	0.00	0.18
Blackpoll Warbler	1.38	0.09	0.88	0.09
Winter Wren	0.88	0.09	0.88	0.09
Yellow-bellied Flycatcher	0.62	0.09	0.62	0.09
American Crow	0.00	0.09	0.00	0.09
Blue-headed Vireo	0.00	0.09	0.00	0.09
Ruby-crowned Kinglet	0.00	0.09	0.00	0.09
Golden-crowned Kinglet	0.50	0.00	0.25	0.00
Gray Jay	0.12	0.00	0.12	0.00
Magnolia Warbler	0.50	0.00	0.38	0.00

**<sup>1</sup> Species of high conservation concern**

**<sup>2</sup> Species of moderate conservation concern**

**<sup>3</sup> Species of low conservation concern**

**(Number of survey points: 2005 = 8; 2007 = 11)**

**Table B. 2. Bird species composition metrics for Dixville Peak transect**

Metric	Species Richness		Relative Abundance	
	2005	2007	2005	2007
<i>Nest guild</i>				
Ground	5	5	4.88	4.00
Shrub-sapling	5	4	3.62	1.25
Bole	0	0	0.00	0.00
Canopy	2	3	1.38	1.00
<i>Forest Type Specialist</i>				
Softwood	10	9	6.75	3.75
Hardwood	0	1	0.00	0.38
<i>Successional Stage Specialist</i>				
Early	2	1	2.75	2.00
Late	4	6	2.25	2.12

Compared to the proposed turbine strings within the Phillips Brook tract, relative abundance values for the breeding bird community associated with the Dixville Peak transect in 2007 were average for ground nesters and low for shrub-sapling, bole, and canopy nesters; low for softwood and hardwood forest specialists; and average for early and low for late successional forest specialists. Species richness values were low for all metrics except ground nesters, which was average. Relative abundance values showed similar patterns for 2005, with the exception of average values for shrub-sapling nesters and early successional stage specialists. Species richness values showed similar patterns for the two years.

**Species of Conservation Concern:** Surveys detected four of the 26 species of conservation concern on the proposed Dixville turbine string, including two of low concern, one of moderate concern, and one of high concern (Table B.3).

**Table B. 3. Species of conservation concern documented in the vicinity of the proposed Dixville turbine string.**

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**High concern**

Bicknell's Thrush

**Moderate concern**

Gray Jay

Yellow-bellied Flycatcher

**Low concern**

Black-throated Blue Warbler

Blackpoll Warbler

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Bicknell's Thrush responded to broadcast surveys at points DP5, DP6, DP7, and DP8 in both 2005 and 2007 and was encountered between points DP6 and DP7 in 2005; Gray Jay was detected at point DP8 in 2005; and Yellow-bellied Flycatcher was detected at points DP2, DP3, DP4, DP7, and DP8 in 2005 and at point DP2 in 2007.

**Soil Type(s):** Saddleback-Glebe-Ricker Association, moderately steep, very stony

The entirety of the proposed turbine string falls on moderately steep, very stony Saddleback-Glebe-Ricker Association soils. These well drained soil types are derived from loose, cryic glacial till. Typical annual timber productivity is 0.7 cord per acre, and forest management concerns include slight erosion hazard and equipment limitations, moderate seedling mortality, and severe windthrow hazard. This association includes areas of bedrock within 2 inches of the surface, boulder fields on south-facing slopes with boulders exceeding 2 feet in diameter, and rock outcrops with vertical drops of 5-20 ft.

Table B. 4. provides information pertinent to forest productivity for each of the component soil types.

**Table B. 4. Properties of soils underlying proposed Dixville turbine string**

Soil type	Depth to bedrock or hardpan (inches)	Available water capacity	Frost action potential	Percent of association
Glebe	20-40 (b)	High	High	35
Ricker	2-26 (b)	Moderate	Low	20
Saddleback	10-20 (b)	Moderate	High	20-30

**Habitat alteration and restoration considerations:** Frost action may hamper establishment of regeneration and cold climate and soil temperatures limit the rate of tree growth throughout this string. Windthrow is likely to increase the size of canopy openings beyond the extent of cutting on Saddleback and Ricker soils. Road and turbine pad construction may require considerable terrain alteration because of steep slopes, boulders, and rock outcrops, resulting in a severe erosion hazard. Construction through boulder fields, outcrops, and shallow-to-bedrock areas would result in severe and essentially permanent alteration of habitat conditions.

**Hydrologic features:** No hydrologic features occur along the proposed turbine string.

**Natural vegetation:** Balsam fir, red spruce, and mountain paper birch dominate the overstory on the Saddleback-Glebe-Ricker Association and sphagnum moss dominates the groundcover.

**Natural disturbance and management history:** The southwestern end of the surveyed transect on Dixville Peak has experienced harvesting within the past 10 years. There is no evidence of forest management along the northern two-thirds of the surveyed transect, where wind has been the primary disturbance agent.

**Current vegetation:** The higher, northern, unmanaged portion of the transect supports a dense canopy of softwood and mixed forest, with red spruce, balsam fir, yellow and heart-leaved paper birches, American beech, and mountain ash of diameters up to 12-16 inches. The understory includes hobblebush, striped maple, red-berried elder, mountain maple, *Rubus*, and saplings of overstory species. Groundcover vegetation includes moss, lichen, grass/sedge, and scattered ferns and forbs. Boulders, ledge, blowdowns, and standing dead softwoods are abundant in some areas. The lower, southern, managed portion has a sparser canopy of red spruce, balsam fir, yellow and heart-leaved paper birches, and mountain ash. The understory includes hobblebush and *Rubus*. Groundcover consists of boulders, moss, lichen, grass/sedge, and tree seedlings, with scattered ferns and forbs.



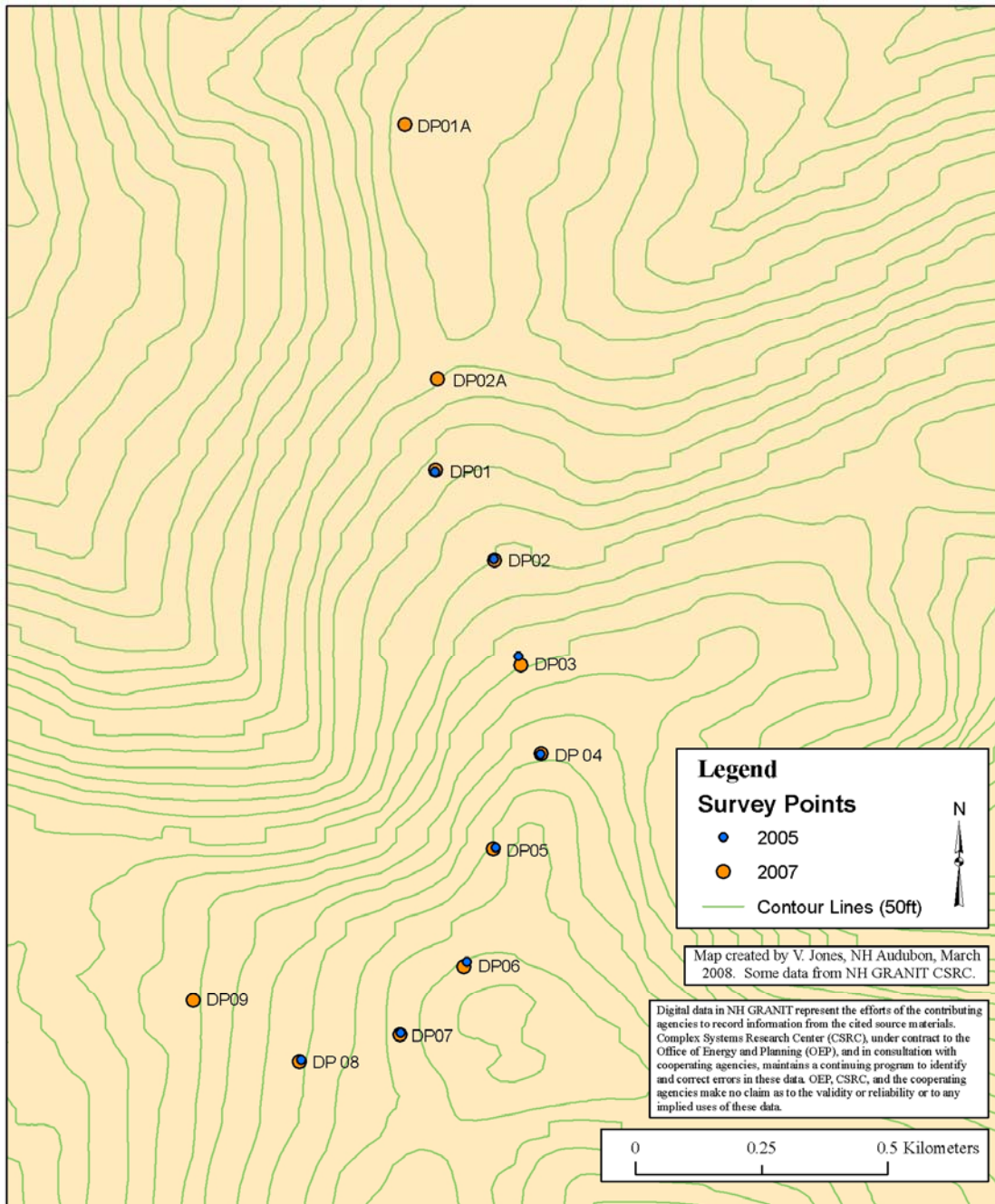


Figure B.1: Locations of 2005 and 2007 bird survey points along the Dixville Peak transect in the proposed Granite Reliable Windpark Project Area, Coos County, New Hampshire